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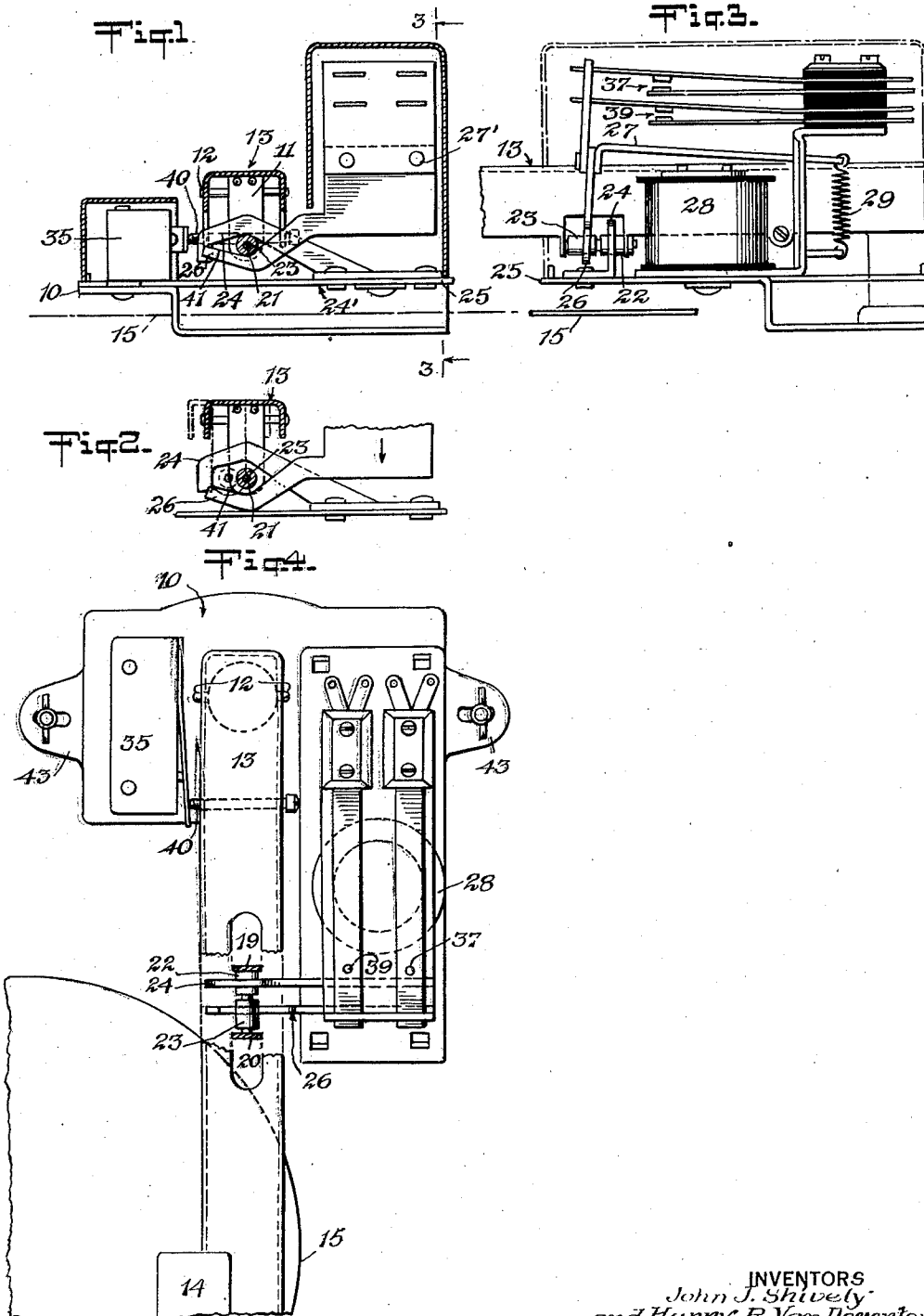
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2,380,799

PHONOGRAPH MECHANISM

Filed Jan. 15, 1944

2 Sheets-Sheet 1



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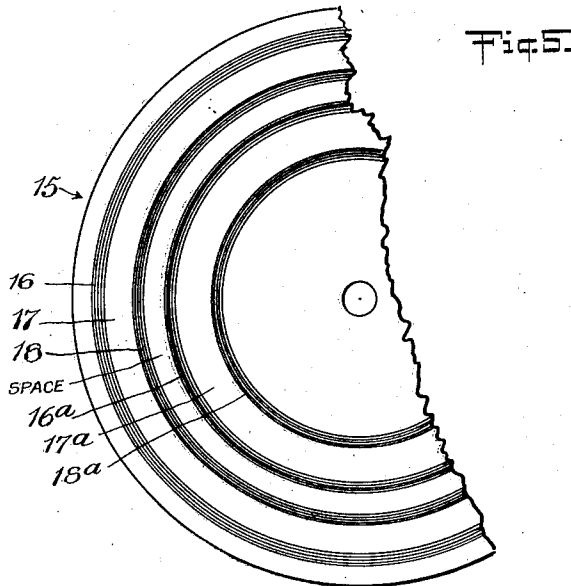
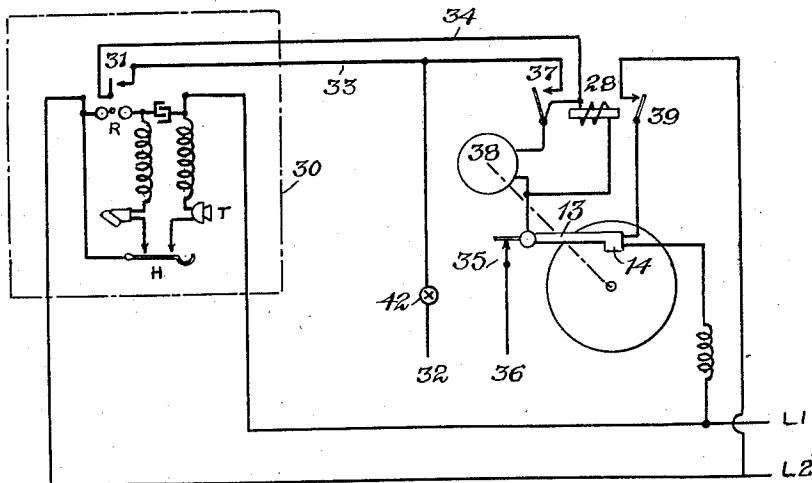


Fig. 6.



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PHONOGRAPH MECHANISM

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Application January 15, 1944, Serial No. 518,347

20 Claims. (Cl. 179-6)

This invention relates to phonograph mechanism and has for an object the provision of such mechanism particularly suited for use in phonographs used for answering a telephone.

Another object is to provide such mechanism wherein the arm (commonly termed tone arm) supporting the translating element of the phonograph, such as the usual recorder or "cutter head," or the reproducer or "pick-up," is securely locked in position when not in use, whereby the phonograph may be moved without danger of the needle of the translating device damaging the record.

Another object is to provide a mechanism of the class described wherein the control of the phonograph is effected without mechanical connections between the control devices and the phonograph motor, thereby permitting an ordinary phonograph motor and record table to be used, the control devices per se being mounted on the tone arm.

A further object is to provide a device of the character described wherein the complete cycle of operations of the device is controlled from and by the movement of the sound record.

Other objects will be apparent from the following specification wherein, by way of illustration, is described a simple and compact phonograph mechanism suitable for use as a telephone answering device. It will be apparent, however, that the invention is not limited to such apparatus, but may be employed wherever suitable and where it is desired to operate the instrument cyclically.

In the accompanying drawings:

Figure 1 is an end view partly in section of mechanism embodying this invention;

Figure 2 is an enlarged view of the jaw mechanism in Figure 1 with the tone arm of the phonograph in cooperative relation to the record thereof;

Figure 3 is a side view of the electro-magnetic means for controlling the tone arm;

Figure 4 is a top view of the mechanism shown in the preceding figures, the contact springs 37, 39 being arranged side by side for clearness and not one above the other, as shown in Figure 3;

Figure 5 is a view looking down on a phonograph record blank that may be used with the mechanism shown in the preceding figures. In this figure, it will be understood that the lead groove 16 runs into the recording in space 17 and that this recording runs into the end grooving 18. No attempt has been made in the drawings to show

the grooving, as such arrangements are well understood; and

Figure 6 is a diagram of the circuit connections of the mechanism shown in Figures 1 to 4, inclusive, in combination with an ordinary telephone instrument.

In the co-pending application for patent, Serial Number 509,544, filed November 1, 1943, is described a phonograph-telephone combination wherein a phonograph supports a subscriber's telephone so as to answer the telephone in the subscriber's absence and deliver to the calling party any message left on the phonograph. The telephone instrument is removable from the phonograph cabinet on which it is supported. Such messages are seldom of more than thirty seconds duration.

If the phonograph is physically combined with the telephone and the latter is of the portable variety, having a casing containing the ringer, switching mechanism et cetera, and supporting the usual handset, when the combined instrument is moved, the tone arm of the phonograph will be displaced from the record. This will destroy the sequence of operations of the phonograph, and the record thereon may be damaged. The present invention prevents this and permits the phonograph-telephone combination set to be used even if the telephone and phonograph are in the same portable casing or cabinet and physically connected together.

Referring to Figure 1, the numeral 10 denotes a base plate carrying the support 11 to which is secured the rotatable tone arm 13 by the usual means such as the pins 12 entering a groove in the support.

The arm is, by this means, free to swing laterally over the record and to be moved vertically toward and away from the record at any point thereover. The record and arm are, therefore, relatively movable and, as will be more fully explained herein, cooperate for a predetermined time when the device is in operation.

The arm 13 carries a suitable translating device such as the usual reproducer 14 adapted, when the arm is raised and lowered, to respectively contact and vertically clear the record 15.

The mounting and construction of these arms are well known and any suitable arrangement can be employed.

The record blank 15, as shown in Figure 5, may be about $4\frac{1}{2}$ " in diameter, and if so, the first grooving thereon may consist of a comparatively coarse lead groove 16 which leads into the sound recording grooves 17 which in this size record for

a thirty second recording will be about $\frac{1}{4}$ " wide.

The sound recording groove leads into a comparatively coarse end grooving 18. The lead and end grooves 16 and 18 may be omitted but are of advantage. In any event, the total lateral travel of the outer end of the tone arm 15, when in operation on any one recording, is but little more than $\frac{3}{8}$ ", and the travel at about the center of the arm where it is controlled is only about $\frac{1}{8}$ ".

The arm 13 has formed therefrom two downwardly extending ears 19, 20 supporting the shaft 21 upon which is mounted the rollers 22, 23.

A stationary jaw 24 shaped as shown to extend over roller 22 is secured as shown at 27¹ to the armature 27 of a relay or electro-magnet, the magnet coil of which is indicated at 28. A spring 29 causes the armature to assume the position shown in Figure 3 and the jaws 24, 25 then grip their associated rollers 22, 23 and hold the arm 13 in the "up" position with the needle of the translating device 14 out of contact with the record 15. Thus, the arm is held firmly when the device is not in use and it can be moved about without displacing the arm or damaging the record.

Referring to Figure 6, a common battery telephone line circuit (or any communication circuit) is shown at L1, L2 to which is connected any suitable communicating apparatus such as the telephone instrument shown within the dotted lines 30. This includes a ringer R having contacts 31 adapted to be closed when the ringer operates as described in U. S. Patent 2,332,359, dated October 19, 1943.

When the ringer operates and contacts 31 close, a circuit is established from current supply wire 32, through switch 42, conductor 33, contacts 31, conductor 34, winding 28 of the relay, through normally closed switch contact 35 on the tone arm switch to current supply wire 36. This causes the relay to close contacts 37 which short circuit contacts 31 so that the relay is locked in circuit.

A circuit is also completed by contacts 37 through the phonograph motor 38 which now begins to operate to rotate the record 15. At or about the same time contacts 37 close, contacts 39 also close, connecting the translating device 14 across the telephone line. This device may be a transmitter button adapted to be acted upon to transmit the sound recording 17 on record 15.

When winding 28 attracts its armature 27, the movable jaw 25 attached thereto drops toward the record, thereby releasing the rollers 22, 23 and arm 13 attached thereto so that the arm drops toward the record and the needle of the translating device 14 engages the lead groove 16 thereon and is guided thereby into the sound recording 17 and from there runs into the end groove 18. These grooves (or the recording 17 if the other grooves are not used) moved the arm 13 from right to left, Figure 4. At the end of this travel, the adjusting screw 40 makes contact with the operating lever of the normally closed switch 35 which opens its contacts. This opens the current supply circuit, as shown in Figure 6, and the circuit is broken through motor 38 and relay winding 28. The relay releases contacts 37 and 39, and the spring 29 moves the armature 27 to the position shown in Figure 3.

As armature 27 is moved by the spring the movable jaw 25, in rising with the armature, picks up the roller 23 and the arm 13. The roller rolls down the slope 41 on the jaw 25 and the arm 13 moves back to the initial starting position above but out of contact with the beginning of lead

groove 16 and the device is ready for the next cycle of operations.

Several different recordings spaced-apart can be made on record 15, and by shifting the plate 10 by means of clamp screws 43 in a manner obvious from the drawings, Figure 4, the arm 13 may be positioned to start in the lead groove 16 to repeat the recording at 17, or to start in lead groove 16 to repeat recording 17 and to repeat the selected recording as long as it is positioned to do so.

An ordinary acoustic pick-up phonograph may be used, with a spring wound motor and connected and operated as described in application Serial Number 518,346 dated January 15, 1944, the reproducer 14 being positioned to cause the reproduced sound to impinge upon the transmitter of the telephone.

In this arrangement the contacts 39 are unnecessary, the telephone hook switch H being mechanically raised by the operation of the phonograph when same is in operation, all as described in the co-pending application Serial Number 518,346 aforesaid.

The construction and arrangement of the contacts 37, 39 on the relay are not described in detail as these can be of any desired construction, and one form is shown in Figures 1 to 4. Also, the contacts 35 may be any suitable form of switch adapted to be operated by the arm 13.

A recorder can be used at 14 if a pre-grooved record is employed, and the device used for recording, the cyclic operation being same as described.

It will be observed that the cyclic operation of the device is brought about by the grooves on the record and the movement thereof. These control the motion of arm 13 and the operation of the relay to restore the arm to starting position. Thus, all motor driven mechanical devices and connections to motor 38 are eliminated, the motor merely driving the record 15 which may be of any type, a disc record being shown by way of illustration.

This invention enables a small phonograph to be mounted within the base of a portable telephone without materially increasing the height of the instrument. This is because of the small travel of the arm 13 and the compact arrangement of the control relay mechanism therefor, said mechanism not only restoring the arm to starting position after each operation, but also controlling the necessary circuits to effect the cycle of operations when the device is answering a call.

It will be seen that the telephone can be used in the usual manner, and by opening switch 42 the phonograph is rendered inoperative, yet arm 13 is firmly held off the record.

While the invention has been described in preferred form it is not limited to the exact structures illustrated, as various modifications may be made without departing from the scope of the appended claims.

What is claimed is:

1. A phonograph having a movable arm, a translating device carried by said arm, a record having means thereon to move said arm transversely while said device is in translating relationship to said record, and means controlled by the movement of said arm for moving said device out of translating relationship with said records, said arm being disconnected from said means while in said translating relationship.

2. A phonograph having a movable arm, a translating device carried by said arm, a record

having means thereon to move said arm transversely while said device is in translating relationship to said record, and means controlled by the movement of said arm for moving said device out of translating relationship with said record and to hold said arm in said last position, said arm being disconnected from said means while in said translating relationship.

3. A phonograph having a movable arm, a translating device carried by said arm, a record, electromagnetic means adjacent said arm and adapted when operated to cause said device to be in translating relationship with said record, means on said record to cause said device to traverse the same, and means associated with said electromagnetic means for moving said device out of translating relationship with said record after said device and record have been in translating relationship for a predetermined time, said arm being disconnected from said means while in said translating relationship.

4. A phonograph having a movable arm, a translating device carried by said arm, a record, said device having an initial starting position relative to said record and out of translating relationship therewith, means on said record to cause said device to traverse the same, holding means adapted to hold said device in said starting position, electrically controlled means for bringing said first means and said record into translating relationship, and means controlled by the movement of said arm for deenergizing said electrically controlled means.

5. A phonograph having a movable arm, a translating device carried by said arm, a record, said device having an initial starting position relative to said record, electrically controlled means for bringing said device and record into translating relationship, and means controlled by the movement of said arm for restoring said translating device to its initial starting position after said device and record have maintained said translating relationship for a predetermined time, said arm being disconnected from said first means while in said translating relationship.

6. A phonograph having a movable arm, a translating device carried by said arm, a record, said device having an initial starting position relative to said record, locking means to hold said arm in said starting position, electrically controlled means for bringing said device and record into translating relationship, and means controlled by the movement of said arm for restoring said translating device to its initial starting position and whereat said locking means may operate after said device and record have maintained said translating relationship for a predetermined time.

7. A phonograph having a movable arm, a translating device carried by said arm, a record, a pair of jaw members adapted to engage said arm and hold same with said device in non-translating position relative to said record, and means for moving at least one of said jaws to release said arm and permit said device to assume a translating position relative to said record.

8. The combination as claimed in claim 7 wherein said last means includes the moving member of an electrically operated device.

9. A phonograph having a movable arm, a translating device carried by said arm, a record, said device having an initial starting position relative to said record, a pair of jaw members adapted to engage said arm and hold same with said device in non-translating position relative

to said record, means for moving at least one of said jaws to release said arm and permit said device to assume a translating position relative to said record, and means on said movable jaw to cause said device to return to said starting position after said device has been in a translating position relative to said record for a predetermined time.

10. A phonograph having an arm, a translating device carried by said arm, a record, motor means for relatively moving said device and said record, a control device having a movable member, control means associated with said member and adapted a first position to hold said translating device out of translating relationship with said record and when in a second position to permit said translating device and record to assume a translating relationship, a source of current, and contacts on said device included in a circuit with said motor means and source of current whereby said motor means is controlled by said control device.

11. The combination as claimed in claim 10 wherein said control device includes an electromagnet.

12. A phonograph having an arm, a translating device carried by said arm, a record, motor means for relatively moving said device and said record, a control device having a movable member, control means associated with said member and adapted in a first position to hold said translating device out of translating relationship with said record and when in a second position to permit said translating device and record to assume a translating relationship, spring means connected to said movable member and adapted to hold same where said translating device is in said first position, a source of current, and contacts on said control device included in a circuit with said motor means and source of current whereby said motor means is controlled by said control device, said circuit being open when said translating device is in said first position.

13. A phonograph having an arm, a translating device carried by said arm, a record, motor means for relatively moving said device and said record, a control device having a movable member, control means associated with said member and adapted in a first position to hold said translating device out of translating relationship with said record and when in a second position to permit said translating device and record to assume a translating relationship, a source of current, normally open contacts on said control device included in a circuit with said motor means and source of current whereby said motor means will be energized when said control device operates to cause said translating device to be in said second position, and means controlled by the relative position of said translating device and said record to cause said control device to move said translating device from said first to said second position and to deenergize said motor.

14. In combination, a communication circuit, a relay connected thereto and having contacts, an electromagnetic device having a winding, a movable member and contacts controlled by the movement of said member, a phonograph having a motor, a record blank and a translating device adapted to cooperate with said record blank, control contacts adapted to be operated by the relative movement of said record blank and translating device after same have been in cooperative relationship for a predetermined time, a source of current, and a circuit connecting said source

of current said contacts on said relay the winding of said electromagnetic device said contacts thereof and said control contacts, said motor being connected to said circuit and controlled by the conjoint operation of said contacts on said electromagnetic device and said control contacts.

15. In combination, a communication circuit, a relay connected thereto and having contacts, an electromagnetic device having a winding a movable member and a first and second pair of contacts controlled by the movement of said member, a phonograph having a motor a record blank and a translating device adapted to cooperate with said record blank, control contacts adapted to be operated by the relative movement of said record blank and said translating device after same have been in cooperative relationship for a predetermined time, a source of current, a circuit connecting said source of current said contacts on said relay the winding of said electromagnetic device and said first pair of contacts thereof and said control contacts, said motor being connected to said circuit and conjointly controlled by the operation of said first pair of contacts on said electromagnetic device and said control contacts, and a circuit connecting said second pair of contacts on said electromagnetic device said translating device and said communication circuit.

16. In combination, a communication circuit, a signalling device connected thereto and having contacts, a transmitting device and means for connecting same to said circuit, an electromagnetic device having a winding a movable member and a first and second pair of contacts controlled by the movement of said member, a phonograph having a motor a record blank and a translating device adapted to cooperate with said record blank, control contacts adapted to be operated by the relative movement of said record blank and said translating device after same have been in cooperative relationship for a predetermined time, a source of current, a circuit connecting said source of current said contacts on said signalling device the winding of said electromagnetic device

and said first pair of contacts thereof and said control contacts, said motor being connected to said circuit and conjointly controlled by the operation of said first pair of contacts on said electromagnetic device and said control contacts, and a circuit connecting said second pair of contacts on said electromagnetic device said transmitting device and said communication circuit.

17. In combination, a communication circuit, a device connected thereto and adapted to be operated by current flowing therein and having contacts, an electromagnetic device and a source of current for operating the same controlled by said contacts, a phonograph having a motor controlled by said electromagnetic device, said phonograph having a movable member adapted to be engaged and moved by the operation of said electromagnetic device, and contacts controlled by the position of said movable member for controlling the operation of said electromagnet device.

18. The combination as claimed in claim 17 wherein said electromagnetic device has a movable member connected to said movable member of the phonograph whereby when said electromagnetic device is not energized said last mentioned member is moved to a predetermined starting position.

19. In a device of the character described, an electromagnetic device having a movable member, and means connected to said member to grasp and hold a phonograph tone arm in non-operative position when said device is not energized and to release said arm when said device is energized.

20. In a device of the character described, an electromagnetic device having a movable member, means connected to said member to grasp and hold a phonograph tone arm in non-operative position when said device is not energized and to release said arm when said device is energized, and control contacts adapted to be operated by said member.

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